

## 299-W18-95 (A7578) Log Data Report

### Borehole Information:

<b>Borehole:</b> 299-W18-95 (A7578)		<b>Site:</b> 216-Z-18 Crib			
<b>Coordinates</b> (WA State Plane)		<b>GWL (ft)<sup>1</sup>:</b> n/a <sup>2</sup>		<b>GWL Date:</b> 9/23/2003	
<b>North</b>	<b>East</b>	<b>Drill Date</b>	<b>TOC<sup>3</sup> Elevation</b>	<b>Total Depth (ft)</b>	<b>Type</b>
135,244.99 m	566,435.27 m	Feb. 1972	209.43 m	80	Cable Tool

### Casing Information:

<b>Casing Type</b>	<b>Stickup (ft)</b>	<b>Outer Diameter (in.)</b>	<b>Inside Diameter (in.)</b>	<b>Thickness (in.)</b>	<b>Top (ft)</b>	<b>Bottom (ft)</b>
Welded steel	3.25	6 5/8	6	5/16	+3.25	77
The logging engineer measured the casing stickup using a steel tape. A caliper was used to determine the outside casing diameter. The caliper and inside casing diameter were measured using a steel tape, and measurements were rounded to the nearest 1/16 in. Casing thickness was calculated. Casing bottom is as reported from the well completion summary report (Chamness and Merz 1993).						

### Borehole Notes:

Borehole coordinates, elevation, and well construction information, as shown in the above tables, are from measurements by Stoller field personnel, Chamness and Merz (1993), and HWIS<sup>4</sup>. Zero reference is the top of the 6-in. casing.

### Logging Equipment Information:

<b>Logging System:</b>	Gamma 1G	<b>Type:</b>	SGLS (35%) 34TP10967A
<b>Calibration Date:</b>	04/2003	<b>Calibration Reference:</b>	GJO-2003-438-TAR
		<b>Logging Procedure:</b>	MAC-HGLP 1.6.5, Rev. 0

### Spectral Gamma Logging System (SGLS) Log Run Information:

<b>Log Run</b>	<b>1</b>	<b>2</b>	<b>3/Repeat</b>		
Date	09/23/03	09/24/03	09/24/03		
Logging Engineer	Spatz	Spatz	Spatz		
Start Depth (ft)	18.0	74.0	18.0		
Finish Depth (ft)	4.0	19.0	8.0		
Count Time (sec)	200	200	200		
Live/Real	R	R	R		
Shield (Y/N)	N/A <sup>5</sup>	N/A	N/A		
MSA Interval (ft)	1.0	1.0	1.0		
ft/min	N/A	N/A	N/A		
Pre-Verification	AG015CAB	AG016CAB	AG016CAB		
Start File	AG015000	AG016000	AG016056		

Log Run	1	2	3/Repeat		
Finish File	AG015014	AG016055	AG016066		
Post-Verification	AG015CAA	AG016CAA	AG016CAA		
Depth Return Error (in.)	0	N/A	-1		
Comments	No fine-gain adjustment.	No fine-gain adjustment.	Repeat section.		

### **Logging Operation Notes:**

Zero reference was top of the 6-in. casing. Logging was performed with a centralizer installed on the sonde. Pre- and post-survey verification measurements for the SGLS employed the Amersham KUT ( $^{40}\text{K}$ ,  $^{238}\text{U}$ , and  $^{232}\text{Th}$ ) verifier with serial number 118. Maximum logging depth achieved was 74 ft.

### **Analysis Notes:**

<b>Analyst:</b>	Sobczyk	<b>Date:</b>	10/23/03	<b>Reference:</b>	GJO-HGLP 1.6.3, Rev. 0
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SGLS pre-run and post-run verification spectra were collected at the beginning and end of the day. All of the verification spectra were within the control limits. The peak counts per second (cps) at the 609-keV, 1461-keV, and 2615-keV photopeaks on the post-run verification spectra as compared to the pre-run verification spectra were between 3.0 percent lower and 2.3 percent higher at the end of the day. Examinations of spectra indicate that the detector appears to have functioned normally during logging, and the spectra are accepted.

Log spectra were processed in batch mode using APTEC SUPERVISOR to identify individual energy peaks and determine count rates. The post-run verification spectrum was used to determine the energy and resolution calibration for processing the data using APTEC SUPERVISOR. Concentrations were calculated in EXCEL (source file: G1GMay03.xls). Zero reference was the top of the 6-in. casing. On the basis of Chamness and Merz (1993) and field measurements, the casing configuration was assumed as one string of 6-in. casing with a thickness of 5/16 in. to 74 ft (total logging depth). Dead time and water corrections were not required.

### **Log Plot Notes:**

Separate log plots are provided for gross gamma and dead time, naturally occurring radionuclides ( $^{40}\text{K}$ ,  $^{238}\text{U}$ , and  $^{232}\text{Th}$ ), and man-made radionuclides. Plots of the repeat logs versus the original logs are included. For each radionuclide, the energy value of the spectral peak used for quantification is indicated. Unless otherwise noted, all radionuclides are plotted in picocuries per gram (pCi/g). The open circles indicate the minimum detectable level (MDL) for each radionuclide. Error bars on each plot represent error associated with counting statistics only and do not include errors associated with the inverse efficiency function, dead time correction, or casing correction. These errors are discussed in the calibration report. A combination plot is also included to facilitate correlation. The  $^{214}\text{Bi}$  peak at 609 keV was used to determine the naturally occurring  $^{238}\text{U}$  concentrations on the combination plot rather than the  $^{214}\text{Bi}$  peak at 1764 keV because it exhibited slightly higher net counts per second.

### **Results and Interpretations:**

$^{137}\text{Cs}$  was the only man-made radionuclide detected in this borehole.  $^{137}\text{Cs}$  was detected at the depths of 34, 37, and 38 ft with a concentration near the MDL (0.2 pCi/g). The gross gamma log from Fecht et al. (1977) (attached) indicates that the sediments surrounding this borehole contained only background amounts of gamma radiation in 1976.

The plots of the repeat logs demonstrate reasonable repeatability of the SGLS data. The natural radionuclides at energy levels of 609, 1461, 1764, and 2614 keV are comparable between the repeat and original SGLS log runs.

### **References:**

Chamness, M.A., and J.K. Merz, 1993. *Hanford Wells*, PNL-8800, Pacific Northwest Laboratory, Richland, Washington.

Fecht, K.R., G.V. Last, and K.R. Price, 1977. *Evaluation of Scintillation Probe Profiles from 200 Area Crib Monitoring Wells*, ARH-ST-156, Atlantic Richfield Hanford Company, Richland, Washington.

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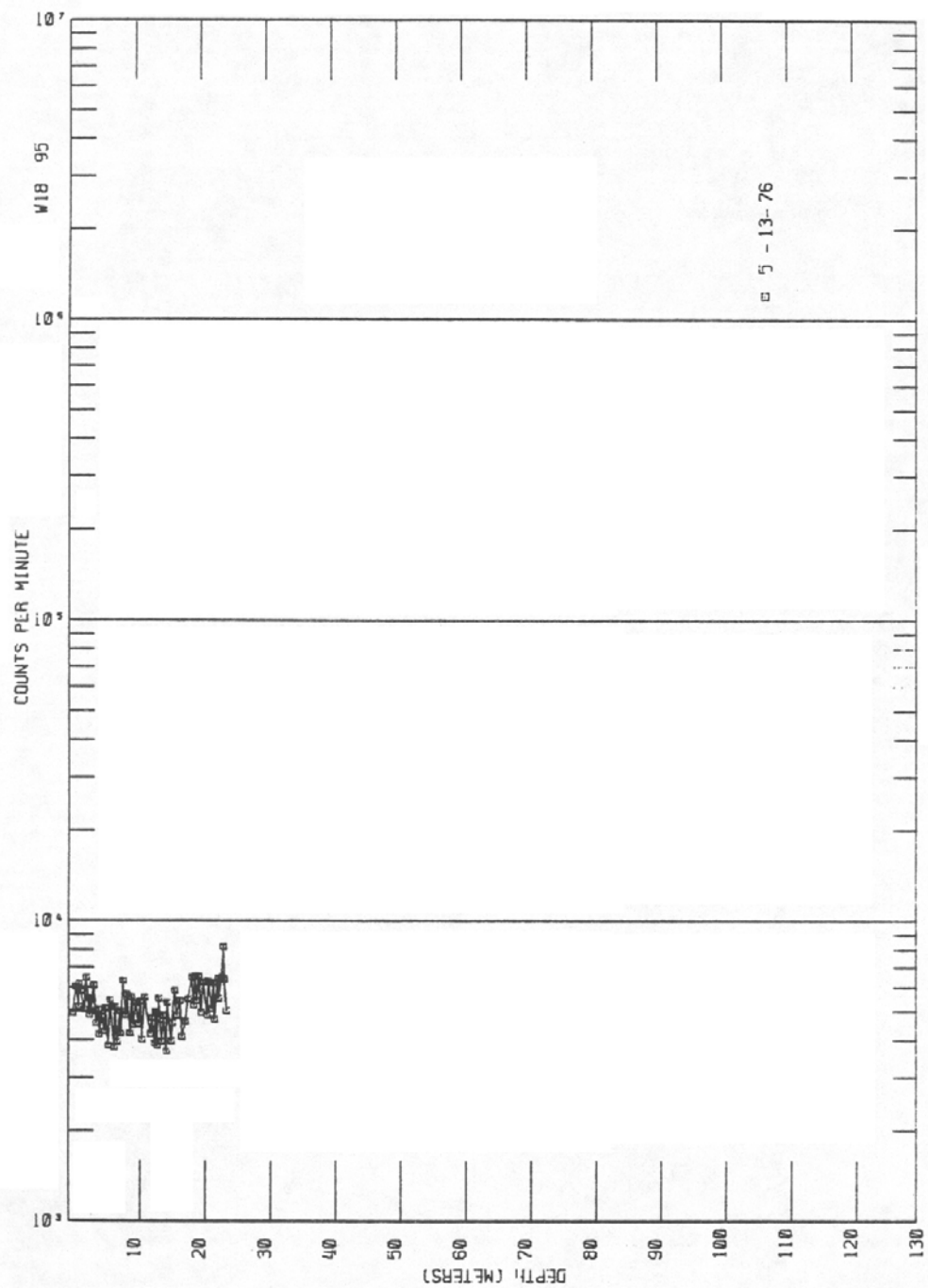
<sup>1</sup> GWL – groundwater level

<sup>2</sup> n/a – not available

<sup>3</sup> TOC – top of casing

<sup>4</sup> HWIS – Hanford Well Information System

<sup>5</sup> N/A – not applicable



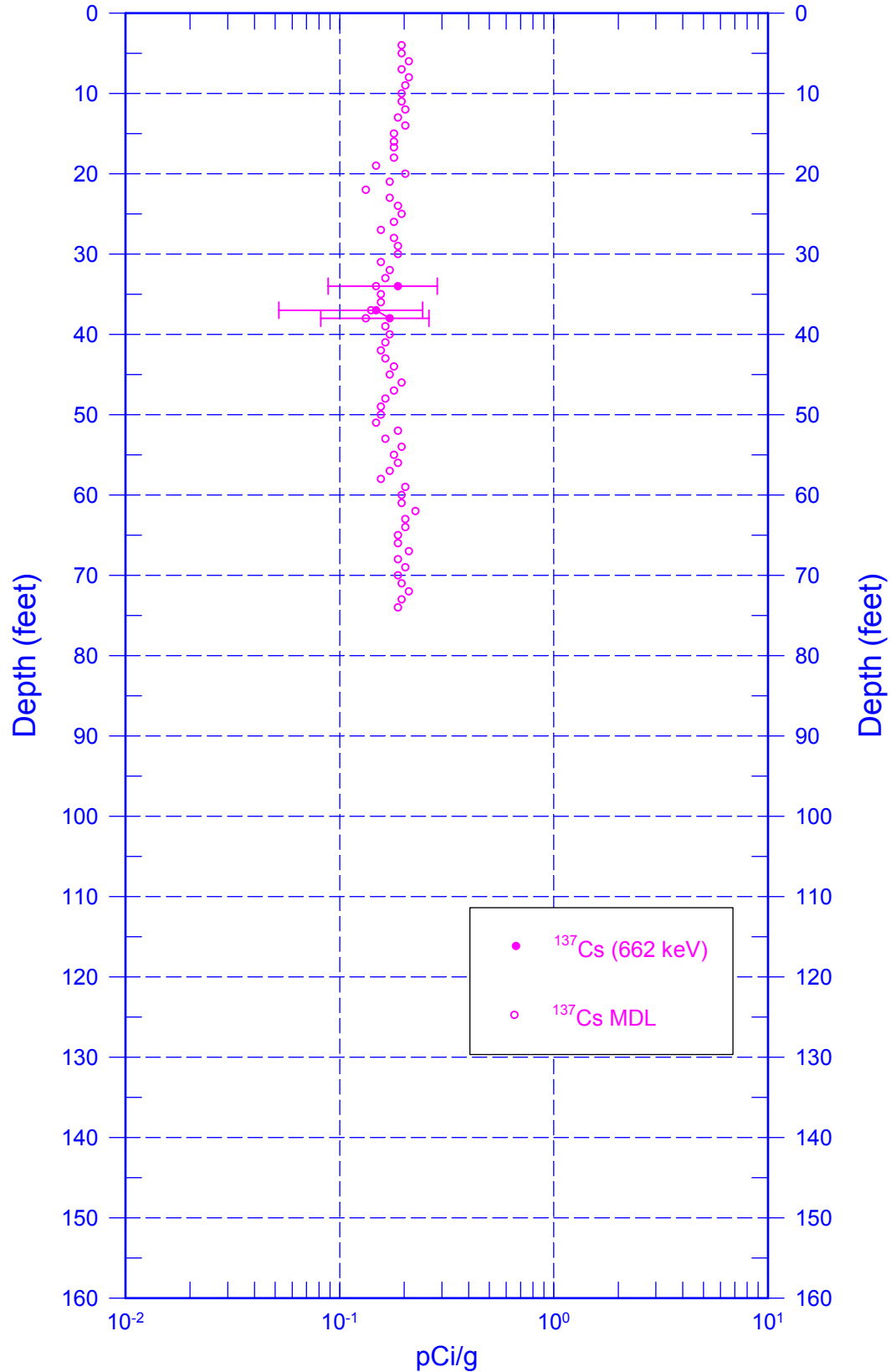
WELL W18-95 SCINTILLATION PROBE PROFILES

from Fecht et al. (1977)

Scintillation Probe Profile for Borehole 299-W18-95, Logged on 5/13/76

# 299-W18-95 (A7578)

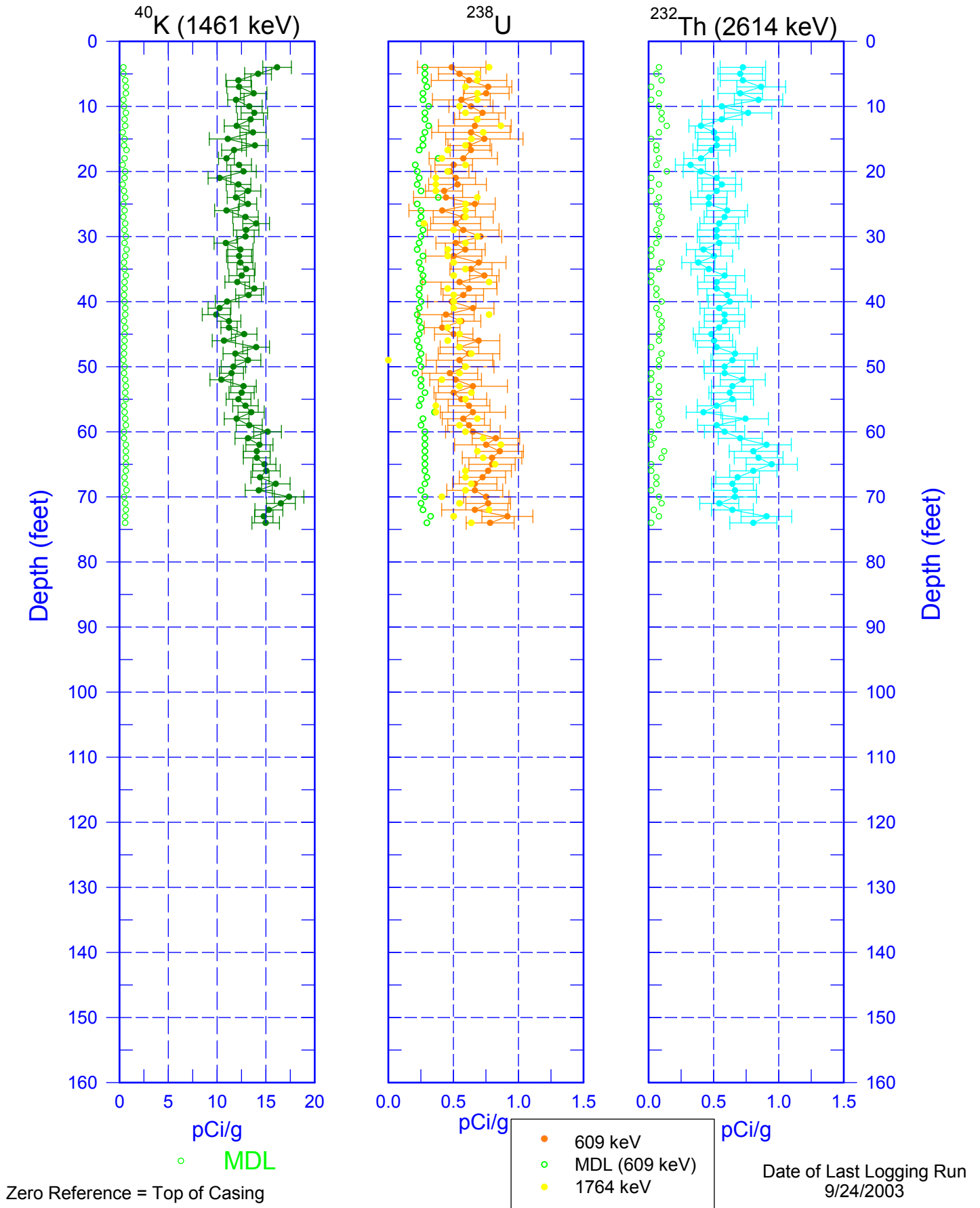
## Man-Made Radionuclides



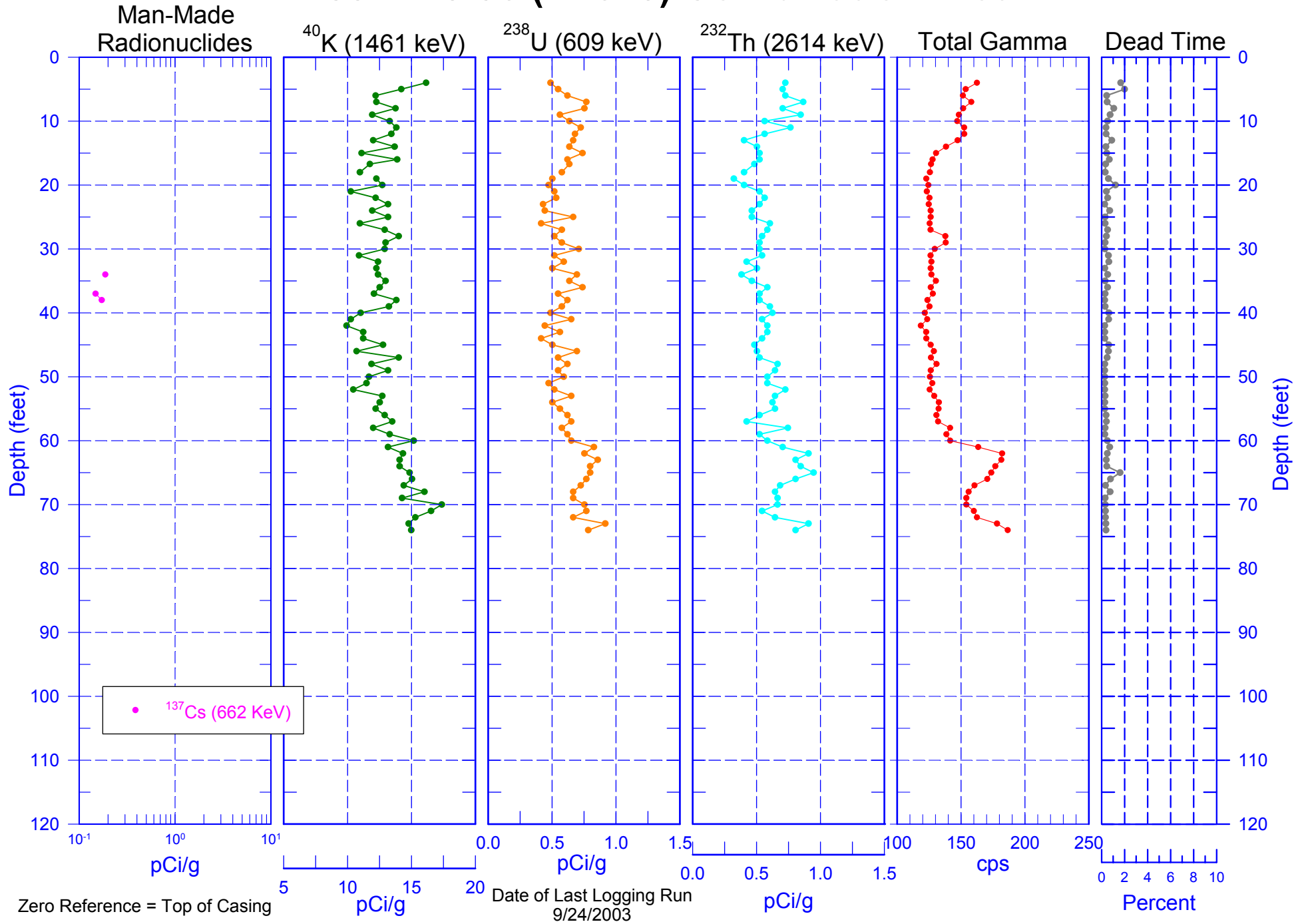
Zero Reference = Top of Casing

Date of Last Logging Run  
9/24/2003

# 299-W18-95 (A7578) Natural Gamma Logs

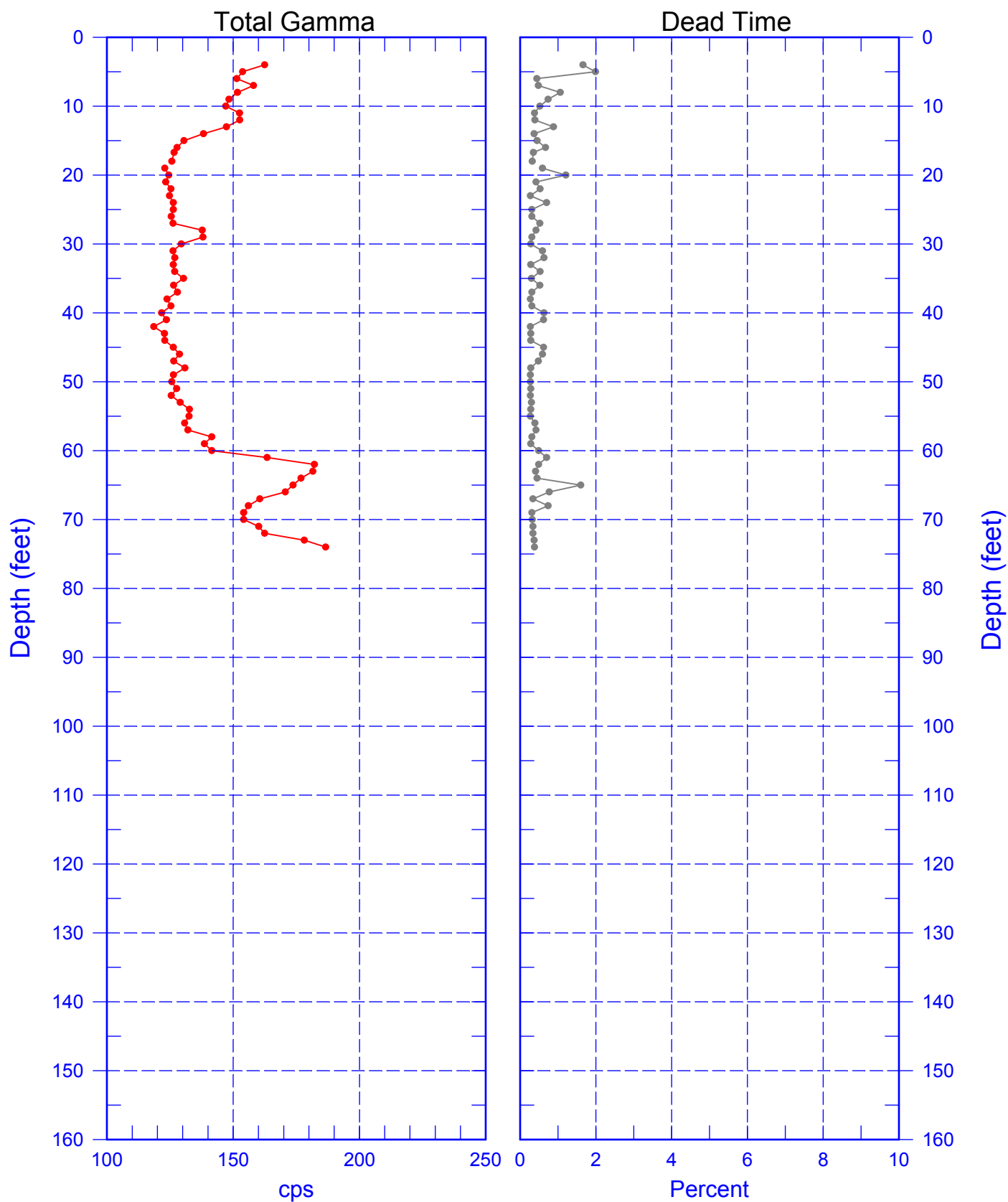


# 299-W18-95 (A7578) Combination Plot



# 299-W18-95 (A7578)

## Total Gamma & Dead Time



Date of Last Logging Run  
9/24/2003

Zero Reference = Top of Casing



# 299-W18-95 (A7578)

## Rerun of Natural Gamma Logs (18.0 to 8.0 ft)

